HABITAT & BIODIVERSITY CONSERVATION

RECOMMENDED FOR GRADES 2 - 4

A Unit on Biodiversity, Ecosystems, Climate Change, and Environmental Solutions

WRITTEN AND DEVELOPED BY EMILY VOREAS
Our Habitat & Biodiversity Conservation unit combines environmental education with tangible conservation solutions. With eco-anxiety on the rise, we believe that teaching solutions alongside challenges will benefit the mental health of students and help the planet at the same time. If you have questions, comments, or requests for our next unit, please email info@reservaylt.org.

**HABITAT & BIODIVERSITY CONSERVATION**

Next Generation Science Standards .................................................. 2
Glossary .......................................................... 3

**Lesson 1 – What is Biodiversity?** .................................................. 4
Additional Materials .......................................................... 5
Species Discovery Worksheet .......................................................... 6

**Lesson 2 – Where Do You Find Biodiversity?** .......................... 7–8

**Lesson 3 – Threats to Biodiversity** ........................................... 9–10
Exit Ticket Worksheet .......................................................... 11

**Lesson 4 – Solutions** .......................................................... 12
Solutions Worksheet .......................................................... 13–14
Promise Sheet .......................................................... 15

**Lesson 5 – My First Action** .......................................................... 16
One Million Letters Template .......................................................... 17–18
Acknowledgments & More Info .......................................................... 19
The lessons in this unit address the following Next Generation Science Standards:

| 2 | 2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.  
    | 2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.  
    | 2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. |
|---|---|
| 3 | 3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.  
    | 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.  
    | 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.  
    | 3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. |
| 4 | 4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.  
    | 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.  
    | 4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. |
biodiversity (biological diversity): The combination of all living things in a place. It can include animals, plants, and even single-celled algae.

ecosystem: Homes with biodiversity. Similar terms: habitat, biome, environment

carbon dioxide (CO2): A gas in the air. Plants “breathe it in” and humans breathe it out.

greenhouse gases: Different gases in the air (including water, carbon dioxide, methane, etc.). These gases act like a blanket around the earth and absorb the sun's heat (known as The Greenhouse Effect).

oxygen: A gas in the air. Plants “breathe it out” and humans breathe it in.

fossil fuel: A natural fuel (source of energy) such as gas, oil or coal. Fossil fuels were formed hundreds of millions of years ago from the remains of living organisms.
*Extra information: The organisms were made of carbon, and were then squashed under layers of earth. The pressure transformed the remains into gas, oil, or coal. When burned, fossil fuels release CO2 into the atmosphere.

climate change: A change in Earth’s climate patterns. Over time, Earth has experienced much colder climates and much hotter climates.
*Extra information: Climate is the long term average of the weather over decades. Weather is the short changes of energy around the globe.

global warming: Scientists are noticing an increase in the earth’s temperature. This is because greenhouse gases (such as Carbon Dioxide) are building up in our atmosphere and acting like a blanket around the earth. The Greenhouse gases are trapping the sun’s heat and warming the earth faster than normal.

lawsuit: A process by which disputes between people are decided in court.
*Extra information: In the lawsuit Juliana vs. United States, 21 kids are suing the US government for failing to protect the earth against climate change.
WHAT IS BIODIVERSITY?

*Essential Question:* Why is biodiversity important?

**Summary**
This lesson will teach students about biodiversity. Biodiversity (short for biological diversity) is the combination of all living things in a place. It can include animals, plants, and even single-celled algae that are too small to see with a microscope. The more diverse or different an area is, the stronger it will be because every species is linked and relies on one another to survive and thrive.

**Hook**
*VIDEO:* Bill Nye Biodiversity (22 min.) + Question Sheet  
*OR BOOK:* I See a Kookaburra by Steve Jenkins and Robin Page + discussion questions  
*FOLLOWED BY:* KWL Chart

### Web of Life

**Directions:**
Sit in a circle. Explain how the ball of string represents connections between plants and animals. Teacher (representing the sun) starts because all energy comes from the sun. Pass string to the tree student because tree needs the sun's energy to grow. The tree chooses a plant or animal that is somehow connected to it. Continue until everyone is holding string and connected to the web.

**String Tug:**
*DISCUSS:* What happens if the sun doesn’t shine? *Plants will die, and other animals will starve.*  
Class sits very still and teacher (sun) tugs on string. When they feel the tug, they should tug gently. Watch as the tugs move the web. The entire web should be shaking. Repeat for the loss of individual species.  
*DISCUSS:* What do you notice about the web? *The entire web is connected.*

**Supplies:**
- Ball of string
- Plant/Animal Cards

**>> EXIT TICKET**
KWL Chart Sticky Notes: What do you still wonder about biodiversity?
Lesson 1: Additional Materials

ACTIVITY #2

Species Discovery

Directions:
Go outside to a nearby green space. Give each student a Species Discovery Worksheet (or multiple, depending on your available class time). Split the class into pairs or small groups, and spread out until each group has their own “discovery zone” to explore. They should not need a large patch to find multiple species.

Worksheet:
Travel around to each group as they work, and encourage students to look closely for smaller species they might be overlooking. Continue until each group has several species documented, then gather to present findings.

DISCUSS: Did you find more species than you expected in your discovery zone? Some species are very small, and you will only find them by looking closely.

DISCUSS: What can we do to protect these species in our ecosystem? Don’t kill bugs, do pick up litter (safely!), and volunteer with local environmental groups to help plant trees and monitor wildlife.

RESOURCES

Video:
TED Ed, Why is biodiversity so important? - Kim Preshoff:
thekidshouldseethis.com/post/why-is-biodiversity-so-important-ted-ed

Website:
Bio-benefits: amnh.org/explore/ology/biodiversity/bio-benefits2
WHERE DO YOU FIND BIODIVERSITY?

Essential Question: Which biomes contain the most biodiversity?

“Ecosystems can be as small as a drop of water, or as huge as a whole ocean.”

-Bill Nye

Summary

Ecosystem, habitat, biome, environment... these are all names for homes with biodiversity. You can find biodiversity in deserts, oceans, arctic areas, grasslands, and many types of forests. In particular, tropical rainforests cover approximately 6% of the earth's surface and house around one half to three quarters of the earth's species of animals and plants.

Hook

VIDEO: Biome Introduction Video

TWITTER GRAPH - Uses emojis to represent biodiversity by latitude

BOOK: The Rainforest Grew All Around by Susan Mitchell - Free book through Epic! (must log in)

ACTIVITY

Sound Map

Directions:

Students have 5-10 minutes to create a Sound Map of noises in the rainforest. (Suggested soundtrack: youtube.com/watch?v=8myYyMgsjFE)

Students create an abstract map on a blank sheet of paper to track the sounds they hear in an environment. They may use pictures, shapes, or words to track each individual sound.

Supplies:

Paper
Pens / Pencils

>> EXIT TICKET

Students do a Gallery Walk of Their Peers’ Sound Maps and write notes on individuals’ gallery walk notes sheet, placed next to each sound map. Students can write about what they like and what they wonder for each sound map.
RESOURCES

Websites:
More information: wwf.panda.org/our_work/forests/importance_forests/tropical_rainforest/
Rainforest coloring sheet: rainforest-alliance.org/coloring-pages/rainforest
What is Biodiversity?: amnh.org/explore/ology/biodiversity/what-is-biodiversity
Sound Maps: sensorytrust.org.uk/information/creative-activities/sound-maps.htm

Video:
Suggested soundtrack (many music streaming websites and apps also have free rainforest sounds, and may work better, depending on your internet strength): youtube.com/watch?v=8myYyMgsfPE
THREATS TO BIODIVERSITY

*Essential question:* Why should we worry about biodiversity?

**Summary**
The earth’s temperature has always fluctuated over millions of years. It has been much hotter and much colder. Unfortunately, over the past 100 years, the earth has been heating up at an alarming rate. The climate is changing faster than the biodiversity can evolve, and it is having an impact on many species’ survival. Also, humans are cutting down trees and taking away many species’ homes. Many species are losing their homes and having trouble acclimating to the new conditions on Earth.

**So what’s the deal with global warming?**
Plants “breathe in” Carbon Dioxide (CO2) and release Oxygen. Most animals breathe in Oxygen and release CO2. This keeps the levels of CO2 and Oxygen in the atmosphere relatively equal. However, over the past several hundred years, humans have started to burn great amounts of fossil fuels to power their lives. When fossil fuels (oil, coal, wood) are burned, they release CO2 into the air. Unfortunately, there is more CO2 than the plants can handle, which has led to a large surplus of CO2 and other greenhouse gases floating in our atmosphere. The problem is, the CO2 acts like a blanket and traps the sun’s heat close to the earth.

**Hook**
*BOOK: Buried Sunlight* by Sallie Chisolm
Optional discussion questions on pages 7-8
*Note: This book has amazing information, but the last ⅓ can be a bit scary. Consider skipping pages 25-28 (“Your Earth has begun to feel these changes…”)*
Lesson 3, Continued

Activity

Web of Life

Directions:

In container 1, pour water over multiple sponges so sponges absorb most of the water.

DISCUSS: What do you notice? The plants are “breathing in” the CO2 from the air.

In container 2, pour water over 0-1 of the sponges so there is a lot of excess water.

DISCUSS: What do you notice? The CO2 builds up in the air when we do not have enough plants.

Squeeze water out of the sponges.

DISCUSS: What do you notice? The CO2 is released when we burn trees and other fossil fuels.

Video Conclusion:

Watch this timelapse video of a glacier melting over 10 years.

DISCUSS: What did you see, and why is it happening? Why might the seas be rising? Where is the extra water coming from? Did you know that wetter air can cause storms, floods or even droughts?

Supplies:

Water (to represent CO2)
Sponges (to represent trees)
2 Containers

Resources

Websites:

Weather vs. Climate: pnmm.nasa.gov/education/weather-climate
Causes of Climate Change: climate.nasa.gov/causes/
Threats to Biodiversity: amnh.org/explore/ology/biodiversity/going-going-gone

EXIT TICKET

HANDOUT: PRINT EXIT TICKET
WORKSHEET ON NEXT PAGE
Name:

How could these changes affect our lives?:

Name:

How could these changes affect our lives?:
SOLUTIONS

Essential question: What can we do to conserve the earth’s biodiversity?

Summary
In 2018, 15 year old Greta Thunberg stood outside her government in Sweden holding a sign for “stronger climate action”. Other students joined the movement, and now hundreds of school strikes for climate have been held all over the world. Greta wasn’t the first youth environmental advocate, but her actions have provoked the strongest response yet. Students worldwide are demanding that their communities take action to slow down global warming and climate change.

Kids are becoming the leaders in the fight to protect our planet. And people can start by changing habits at home and in their communities. Reduce, Reuse and Recycle are the most well-known solutions. People can also educate themselves and speak out to spread the word.

Hook
Picture of Great Thunberg and the climate strikes and/or Greta Thunberg Video.

DISCUSS: What are your thoughts about this photo/video? Why is climate change a problem for kids? Do you think the government should help with climate change? How can it help?

Activity

Gallery Walk

Directions:
Print out these solutions to help save the environment: Solutions for Kids. Students work in groups to do a gallery walk (or jigsaw if time is limited) spending several minutes at each solution. They may take notes using the template provided on page 13.

>> EXIT TICKET
HANDOUT: Students will each choose a solution to commit to in order to help biodiversity. Students will write a promise about their choice of solution. Promise sheets can be found on page 15.

Resources

Websites:
Drawdown Solutions: drawdown.org/solutions-summary-by-rank
NASA Climate Kids: climatekids.nasa.gov/how-to-help/
Name:

Directions:
Consider each solution. What problem does it solve, and how? Take notes on this sheet with your team.

### STOP WASTING FOOD

Problem:

Notes on the solution:

### EAT MORE PLANTS

Problem:

Notes on the solution:

### USE LESS PLASTIC

Problem:

Notes on the solution:

### SAVE WATER

Problem:

Notes on the solution:
### Recycle

**Problem:**

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

**Notes on the solution:**

_________________________________________________________________

_________________________________________________________________

### Ride Bikes

**Problem:**

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

**Notes on the solution:**

_________________________________________________________________

_________________________________________________________________

### Compost

**Problem:**

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

**Notes on the solution:**

_________________________________________________________________

_________________________________________________________________

### Plant More Plants

**Problem:**

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

**Notes on the solution:**

_________________________________________________________________

_________________________________________________________________
Promise to Help Save Our Earth

Key solutions:
- Stop wasting food
- Eat more plants
- Save water
- Use less plastic
- Recycle
- Ride bikes
- Compost
- Plant more plants

I promise to ...

This will help the earth because ...

I will do this by ...
MY FIRST ACTION

*Essential Question:* How can we help save biodiversity in the rainforests?

Summary
As we learned in Lessons 2-3, the rainforests are full of biodiversity, but are often threatened by human activity. The solutions we discussed in Lesson 4 will help you reduce your carbon footprint and be a better steward of the planet. But many of those actions prove their impact over time, and we want to end this lesson with an action that will help save the rainforest *right now!*

Reserva: The Youth Land Trust is an organization that works to empower children to save the planet directly. In fact, they need your help right now as they work to create the world’s first *entirely youth-funded* nature reserve—a highly threatened piece of rainforest in Ecuador.

But you can also take action right now simply by writing a letter for Reserva’s One Million Letters campaign, which we'll be taking to world leaders at the United Nations. Write about why you love nature, and ask world leaders to commit to protecting wild places like the rainforest. In return, we’ll match your letter with $3 toward the youth-funded reserve. That’s enough money to buy a classroom-sized piece of land!

Want to save even more rainforest? You can help by donating your own money or creating a fundraiser at home or school—maybe it’s a bake sale, a lemonade stand, or even a walk for wildlife. Every donation will be matched dollar for dollar by our partner, Rainforest Trust! (*Learn more at reservaylt.org/donate.*)

Hook
*Video Introducing Reserva* - Winner of the UN Global Youth Video Compeition

**ACTIVITY**

**One Million Letters**

**Directions:**
Write a letter about why you love nature, and why we should protect it. Teachers can send youth letters by mail to P.O. Box 57277, Washington, D.C. 20037 or email a photo of each letter to 1millionletters@gmail.com.
Acknowledgments:

Unit created by: Emily Voreas, Reserva Advisory Council Member and Educational Consultant
Design by: Callie Broaddus, Reserva Founder & CEO
Additional Educational Consultants: Carolyn Weddell, Emily Dale

About Reserva

Reserva: the Youth Land Trust is an organization dedicated to empowering youth through conservation, education, and storytelling. Based in Washington, D.C., Reserva is supported by an international Youth Council, a group of (currently) 50 youth from around the world who formally advise on our actions and help design, share, and implement Reserva’s initiatives.

Our Vision:

One day, every young person will feel empowered to make a measurable difference in the future of their planet.

Our Mission:

We create youth-funded nature reserves to protect biodiversity, fight climate change, and to elevate the status of young people as environmental change-makers. We educate youth around the world on the importance of habitat and biodiversity and empower them with this platform for action. We find creative solutions to engage youth living near each project we undertake, to ensure they benefit from and are recognized for their role as stewards of the land.

Contact us:
reservaylt.org
info@reservaylt.org
or
P.O. Box 57277
Washington, D.C. 20037

Social Media:
@ReservaYLT

Please download and share this unit for educational purposes only.
Copyright © Reserva: The Youth Land Trust, LLC.